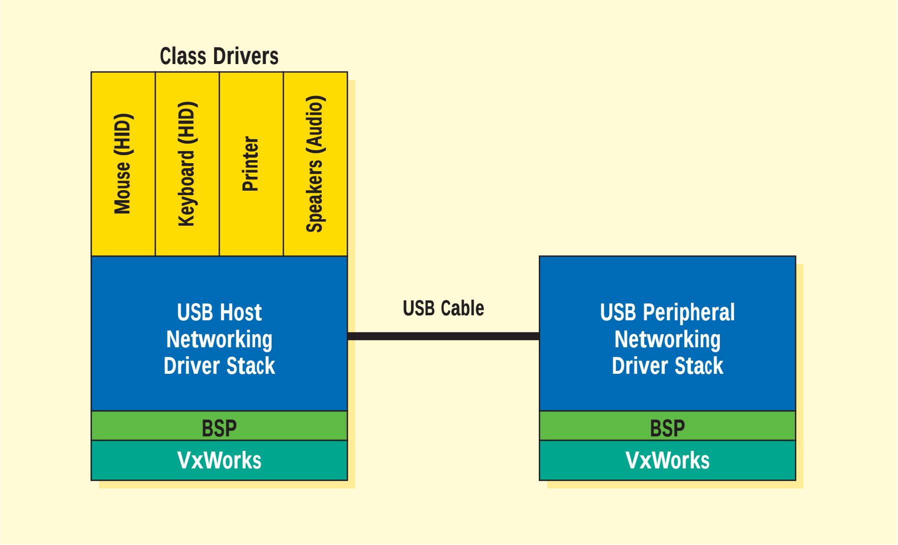
USB Developer's Kit

USB SOFTWARE ARCHITECTURE



Wind River's USB Developer's Kit enables developers to provide standard universal serial bus (USB) connectivity within embedded products and attached peripheral devices. Although USB was originally designed to improve connectivity between a personal computer and its peripheral devices, demand has been growing for USB connectivity in embedded products used in industries such as digital imaging, industrial automation, medical, home networking, global communications, transportation, and test equipment. The USB Developer's Kit includes both host and peripheral driver stacks, thus enabling developers to build USB host and peripheral products and create customized classes of drivers on a wide range of processor architectures.

Components provided in source code

Wind River's USB Developer's Kit comes standard as a source-binary-source product. This means that the class drivers above the USB host driver stack, as well as the small layer of BSP-specific code below that stack, are provided in source code. The peripheral stack also comes in source code. The host driver stack comes standard in binary format, but source code for that stack is also available.

Features

- USB 1.1 stack
- UHCI and OHCI controllers
- All data transfer modes
  - Control
  - Interrupt
  - Bulk
  - Isochronous
- 12Mb / sec. and 1.5Mb / sec. data rates
- Hot swap capability
- Layered hub support
- Auto device detection
- Power management
- Software includes:
- Source code class drivers: mouse (HID), keyboard (HID), printer, speakers (audio)
- Binary host stack
- Source code peripheral stack
- Source code BSP layer
- Documentation
- Optional source code host driver stack

System requirements

- VxWorks® 5.4
- Tornado® II

Supported hosts

- Windows 95 / 98 / NT, Solaris

Supported targets*

- Intel Architecture Family
- PowerPC Architecture Family

Supported USB peripheral hardware

- Philips D12

*Ask your Wind River sales representative about current target availability.

Supports standard host controller interfaces

The host stack supports both the universal host controller interface (UHCI) and the open host controller interface (OHCI).

USB provides economical, versatile connection

USB is a master-slave type, four-wire serial communications protocol that provides hosts and peripheral devices with an economical and versatile channel for low-to-medium-speed communications. A USB network occupies two wires, while power to a peripheral device is provided on the other two wires.

USB currently incorporates low (1.5Mb/sec.) and medium (12Mb/sec.) data rates. USB also provides for power management and the dynamic attachment and removal of devices. Up to 127 peripheral USB devices can be connected to a host though many hub layers. The devices themselves carry self-identification and generic configuration data to pass to the host.

Four data transfer modes available

All four USB modes of data transfer are available with Wind River's USB Developer's Kit: control, interrupt, bulk, and isochronous. These data transfer modes enable asynchronous and isochronous data to be transmitted simultaneously. Asynchronous data is typically error-rate-critical data, while isochronous data is typically used in multimedia applications such as real-time audio or streaming video.

Host class drivers support most common peripherals

Host class drivers supported by the USB Developer's Kit enable developers to connect the most common peripherals "out of the box." Class drivers include keyboard and mouse human interface devices (HIDs) as well as printer and speakers (audio). Class drivers also provide all forms of data transfer.

Host software stack controls data flow

A USB host driver stack automatically identifies and enumerates peripherals attached to the bus, allocates bandwidth to those peripherals, then handles data flow between peripherals and their host device. Because these peripherals are hot-swappable, they can be connected or removed at any time.

Peripheral software stack

The USB peripheral driver stack is a slave-type driver stack that responds to requests from the host. The peripheral stack's main function is to pass data between customer-specific peripheral class drivers and their host. The peripheral stack can, however, initiate wake-up commands to the host after the power management software has put the USB device "to sleep" that is, put the network on standby in order to save battery power.

Wind River
Worldwide Headquarters
500 Wind River Way
Alameda, CA 94501 USA
1-800-545-WIND (toll-free in North America)
1-510-748-4100 phone
1-510-749-2010 fax
inquiries@windriver.com
NASDAQ: WIND

For additional contact information, please see our Web site at www.windriver.com.

Tornado, VxWorks, Wind River, and the Wind River logo are trademarks, registered trademarks, or service marks of Wind River Systems, Inc. Tornado patent pending. All other names mentioned are trademarks, registered trademarks, or service marks of their respective companies.

©2000 Wind River Systems

MCL-DS-USB-004
Printed on recycled paper.